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a review of Comparative smootheology by Stacey, Andrew(N-NUST)

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Stacey, Andrew [Stacey, Andrew Edgell] (N-NUST)

Comparative smootheology. (English summary)

Theory Appl. Categ. **25** (2011), *No.* 4, 64–117.

It is well known that the category of smooth manifolds and smooth mappings is not good enough. By way of example, it is not Cartesian closed. More than a few geometers have proposed convenient categories for smootheology or diffeology, say, K. T. Chen [Ann. of Math. (2) **97** (1973), 217–246; MR0380859; Trans. Amer. Math. Soc. **206** (1975), 83–98; MR0377960; Bull. Amer. Math. Soc. **83** (1977), no. 5, 831–879; MR0454968], A. Frölicher [in *Category theory (Gummersbach, 1981)*, 69–81, Lecture Notes in Math., 962, Springer, Berlin, 1982; MR0682945; Cah. Topol. Géom. Différ. Catég. **45** (2004), no. 4, 267–286; MR2108194], Frölicher and A. Kriegl [*Linear spaces and differentiation theory*, Pure Appl. Math. (N. Y.), Wiley, Chichester, 1988; MR0961256], R. Sikorski [Colloq. Math. **24** (1971/72), 45–79; MR0482794], J. W. Smith [Tôhoku Math. J. (2) **18** (1966), 115–137; MR0202154], Y. H. Clifton and Smith [Trans. Amer. Math. Soc. **105** (1962), 436–452; MR0145524], J.-M. Souriau [in *Differential geometrical methods in mathematical physics (Proc. Conf., Aix-en-Provence/Salamanca, 1979)*, 91–128, Lecture Notes in Math., 836, Springer, Berlin, 1980; MR0607688] and others. This paper tries to study the relationship among various proposed convenient categories. The author thoroughly investigates various functors and adjunctions among these categories.

Hirokazu Nishimura

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